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Algorithms of digital calculations of optimal flight characteristics and rational design parameters

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Abstract

© Medwell Journals, 2016.Computation method of emphasized flight velocities calculation oflight prop engine airplane with taking into account nominal engine performanceis suggested. Algorithm of airscrew blade geometry (twist angle, chord and optimal angle of attack along blade) numerical calculation is developed. Numerical calculations of design parameters include computation of rational blade angle of attack and remove arbitrary presetting these parameters. Automatic choiceof airscrew design parameters matched to wide range of flight velocities for prop engine light planebecome enable. Features comparison of high-altitude airplane and airscrew characteristics calculated by impulse-blade-element theory allow us to state that our algorithm can be effectively used to thrust vs. flight speed design calculations. Design calculation includes several tasks: efficient algorithms of airscrew geometry design calculations, more efficient airscrew operation dew to optimal rate of rotation and changing blade incidence angle. Simple enough algorithm to piston-engine airplane performances calculation by using of engine characteristics power RPM per hour fuel consumption is suggested. Feasible rational versions of plane design parameters are discussed.

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Keywords

Airscrew, Blade twist, Computation methods, Design performance, Flight performance, High-altitude